

REMARKS

Attached hereto is an Excess Claims Fee Payment Letter and fee.

Claims 1-23 are all the claims presently pending in the application. The claims have been amended to more particularly define the invention according to local practice. Claims 13-23 have been added to claim additional features of the invention and increase scope of coverage.

It is noted that the claim amendments are made only for more particularly pointing out the invention using local practice, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-12 stand rejected under 35 USC §102(e) as anticipated by US Patent 6,834,965 to Raskar et al.

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

As described and defined in, for example, claim 1, the claimed invention is directed to a system for correcting approximate expressions used in geometrical correction of projected images. A projector operates under the control of a program so as to project an image emitted from the projector onto a display surface.

The projector includes means for performing a geometrical transformation on a projected image emitted from the projector in accordance with the shape of a projection surface of the screen using a predetermined approximate expression to correct the projected image for distortion due to the shape of the projection surface of the screen and a value entered for substitution into at least one of a variable and a parameter to transform the predetermined approximate expression.

Conventional methods such as those described beginning at line 18 on page 1 of the specification, require a large amount of memory so that corrected position data be stored for each pixel of the display.

The claimed invention, on the other hand, eliminates this necessity that each pixel corrected data be stored in memory, by allowing a user to provide input corrections for parameters that describe the shape of the screen. These corrections thereby allow the corrected pixel data to be calculated, rather than stored as a mapping correction, thereby eliminating the need for large amounts of memory for storing mapping corrected data for each pixel of the image.

II. THE PRIOR ART REJECTION

The Examiner alleges that Raskar teaches the claimed invention. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by Raskar. Moreover, it is noted that independent claims 1 and 2 are written in means-plus-function format.

That is, even if there arguably are similarities between Raskar and the present invention, this reference can only be described as clearly teaching against one of the features of the present invention, as defined by the final claim limitation of the independent claims.

Thus, taking claim 1 as an example, the final limitation is written in means-plus-function format and defines that the projector includes: "...means for performing a geometrical transformation on a projected image emitted from said projector in accordance with a shape of a projection surface of said screen, using a predetermined approximate expression to correct the projected image for distortion due to the shape of the projection surface of said screen and a value entered for substitution into at least one of a variable and a parameter to transform said predetermined approximate expression."

As clearly demonstrated by item 5 in Figure 2 and described in lines 9-10 of page 6 and continuing to lines 21-25, the mechanism behind this language can include a "... simple input means 5, for example, a slide bar or the like for entering values for substitution into variables.... As the user sets numerical values required for processing as values substituted into variables by sliding the slide bar to the left or right on input means 5, approximate expression processing unit 6 substitutes the numerical values set by input means 5 into the variables included in approximate expressions held therein to calculate the shape resulting from a correction."

In direct contrast, a key function of Raskar is to avoid this user input entirely by having the projectors in the projector cluster automatically determine corrections with a camera that, in the present invention, are entered by the user. That is, as described particularly at line 63 of column 5 through line 6 of column 6, Raskar relies upon projecting a simple structured pattern upon the display surface and then using a camera sub-system 160 to provide an input image of this structured pattern, which input image is then used to develop a correctional mapping mesh.

Applicants submits that such correctional mesh is a concept entirely different from that of the technique of the present invention, in which a mathematical expression defines the projection surface and the user enters one or more values for the image transformation equation by providing an adjustment to a variable in the expression.

The advantage of the present invention is that the corrected image is calculated using this adjusted mathematical expression so that there is no need to maintain a large memory for storing corrected data for each pixel of the image or of the correction mesh of Raskar.

In the rejection currently of record, the Examiner considers that the camera sub-system 160 corresponds to this final limitation of the claimed invention.

However, Applicants submit that, to one of ordinary skill in the art, the automatic mechanism in Raskar does not teach or suggest and is not at all equivalent to the user input of the present invention. Thus, the prior art rejection currently of record for independent claims 1 and 3 is clearly improper because these claims are written in means-plus-function format. This specific format requires that the prior art evaluation be confined to the means described in the specification, plus equivalents thereof, as required by 35 USC §112, sixth paragraph, and as described in MPEP §2181,

Moreover, since a key purpose of Raskar is that of the automatic adjustment of the image without user input, Applicants further submit that Raskar cannot even be used as a primary reference, since a necessary modification of Raskar would be that of defeating this express purpose to incorporate a user input mechanism.

Such modification would be improper under MPEP §2143.01, as follows:

“ If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” and

“If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render claims prima facie obvious.”

Therefore, Applicant submits that there are elements of the claimed invention that are not taught or suggested by Rashkar, and the Examiner is respectfully requested to withdraw this rejection.

Moreover, relative to the rejection currently of record for claims 4-9, Applicants submit that one of ordinary skill in the art would not agree with the Examiner's characterization for either of the statements that “Rashar teaches in column 5 lines 53-42 (sic) that a least square formula is used to determine the linear equation or quadric equation appropriate to the particular surface(s) to be projected upon. (It should be noted that a parabola is the expected solution of the linear equation to a parabolic screen).”

That is, as clearly described beginning at line 63 of column 5, Rashkar teaches the technique of projecting a test pattern onto the display surface, using a camera to capture an image of the projected test pattern, and developing an image correction by developing a mesh composed of triangles that permits a correction of the projected image. This method allows for an automatic correction of the projected image and is not based upon approximating the projection surface, as characterized by the Examiner.

It is also noted, for the record, that a parabola is not described by a linear equation and cannot be thereby approximated, as characterized by the Examiner.

Finally, relative to the rejection for claims 10-12, the Examiner is understood as invoking Official Notice, and Applicants respectfully request that the Examiner provide a reasonably combinable reference indicating the correction for a sinusoidally waved projection surface.

Relative to new independent claim 13, Applicants submit that one of ordinary skill in the art would readily recognize that the mesh mapping technique used in Rashkar fails to satisfy the description in this claim, that the geometrical transformation uses a “...a storage device that stores a predetermined approximate expression for correcting a projected image for distortion due to a shape of a projection surface upon which said projector projects an image....”

Applicants further submit that the input mechanism defined by dependent claims 14-

20 is non-obvious over the automatic adjustment technique of Raskar that uses a mesh mapping correction technique and that the method claims 21-23 are similarly clearly distinguished from conventional methods.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-23, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

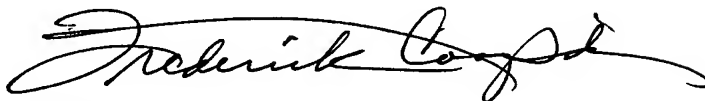
Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date:

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